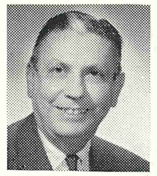
OHIO BRASS MANAGEMENT REPORT

Will diplomas on the wall outrank carpet on the floor?

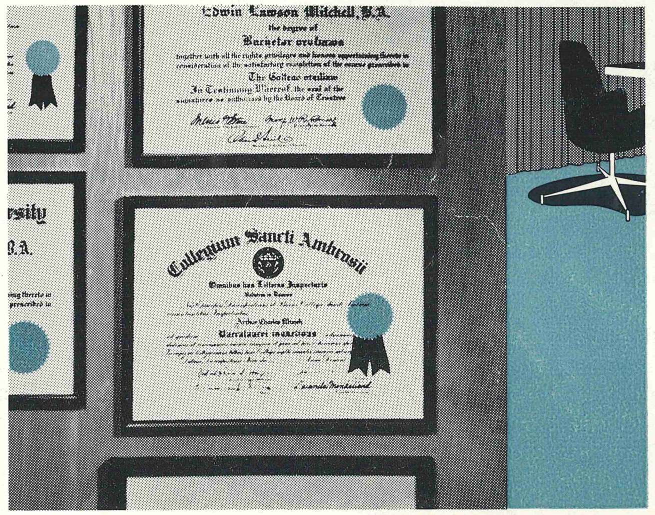
BY ROGER A. BLACK
PRESIDENT, OHIO BRASS COMPANY



An executive's status may soon be measured by the number of diplomas on the wall rather than the thickness of the carpet on the office floor. Today many top college graduates shun industry's job offers and turn to graduate school. Engineering college deans say that four years of college are not enough. Moreover, they add that engineers who graduated before 1955 lack sufficient background in mathematics and science.

WE WOULDN'T DOWNGRADE the value of formal education, and plenty of it, even if we had that much courage. Our Company competes hard for the top engineers, and we get our share. But we don't consider our engineers who graduated before 1955 obsolete. Look at the people responsible for O-B lightning arrester development, for example. At least two of the top engineers haven't seen the inside of a college classroom for over 10 years. And if they did, there is really little they could learn that would help them improve lightning arresters. They would have to write the text books before they could study them.

WE TRY TO DEVELOP engineers with ideas. The quality of their ideas depends on their ability to educate themselves. We ask an engineer to keep up to date on outside developments while he grows in his capacity to handle his job. We can't afford to shuttle him between job and campus. Simple economics dictate that he, like most of us, must spend more time working than studying. And often, work proves to be the best teacher of all.



WE ALSO AVOID CATEGORIZING a man's talent according to his education. Although the electrical engineers on our staff far outnumber other types, we have seen mechanical engineers solve electrical problems that baffled electrical men. We need the new emphasis on quality and quantity of education. But degrees don't always measure capability, or even true education. Experience teaches also, and the man who learns from his experience will be a highly productive employee long after his degree is theoretically obsolete.

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OHIO BRASS

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HI-TENSION NEWS

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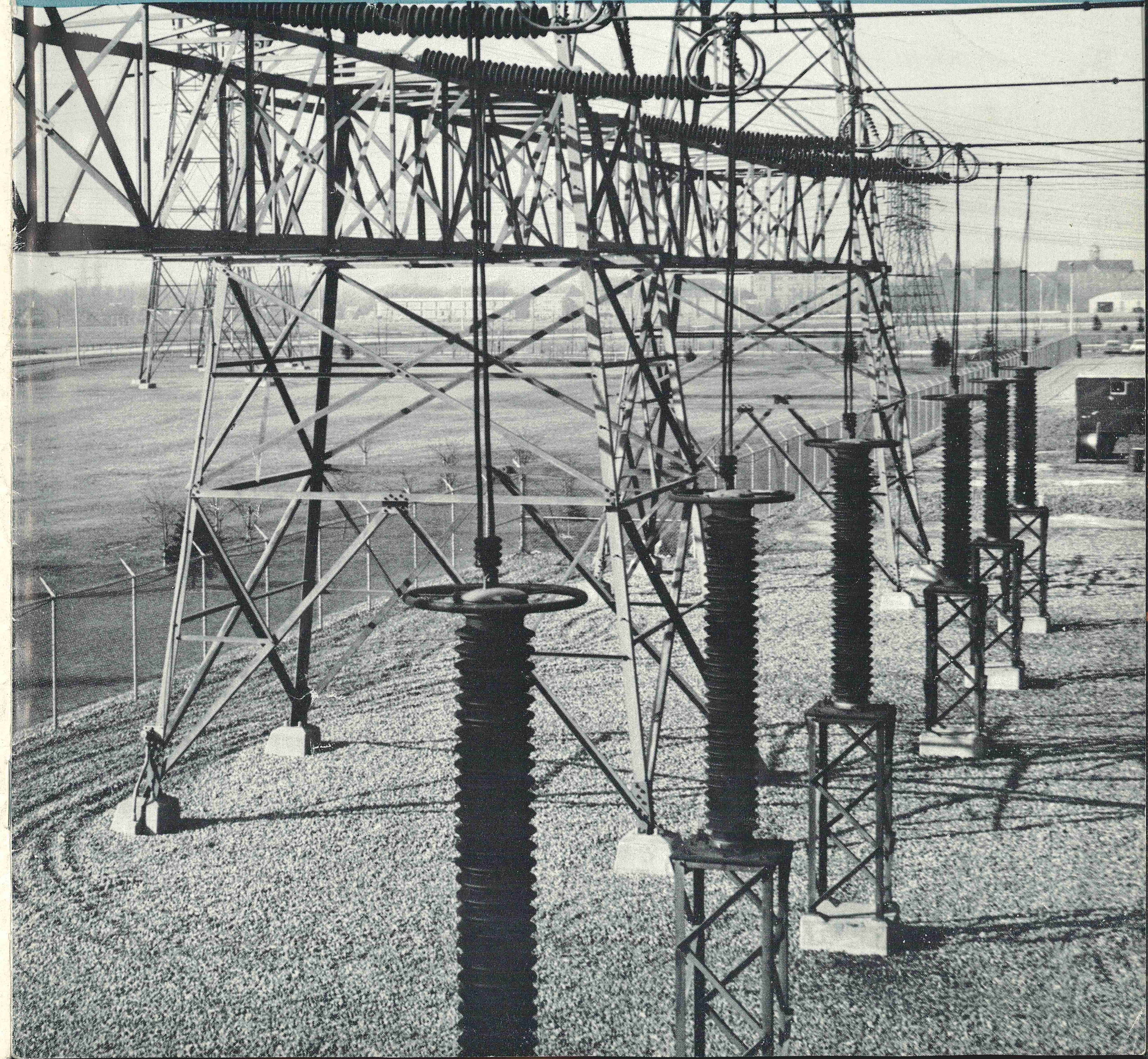
Thorex Type MPR lightning arresters in surge-protective position on 345-kv outgoing lines at the Niagara Falls plant of Power Authority of State of New York

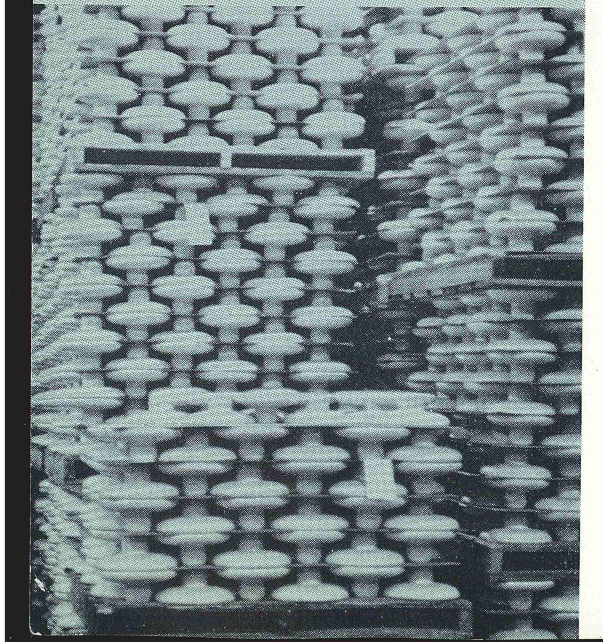


Distribution-Line Cosmetology

O-B adopts new gray color

Skytone, O-B's version of the proposed ASA #70, is a light gray with a slight blue-green cast, and blends well with sky in sunlight and with clouds behind it.

Skytone porcelain suspension insulators palletized in temporary storage awaiting final assembly and testing.



Widespread popularity expected for proposed ASA No. 70, called "SKYTONE" by O-B

"Make your insulators just as good as ever, but make 'em prettier!" That's how one of our customers expressed his wishes in the aesthetically inspired boom for new light colors in distribution-service construction.

For a time, in an attempt to fill the need for light-colored overhead material, a rainbow of blues and greens and grays threatened to fill the sky. Every manufacturer had his interpretation of what the sky looked like and what the customer wanted. A rainbow of colors, and opinions, was bouncing around the electric utility industry.

Happily, not too long ago, the T&D Committee of the EEI urged a solution to this hodge podge. The committee recommended -- to ASA -- that Munsell No. 5 BG 7.0/0.4 be adopted as the standard color for insulators and other overhead construction material.

It is proposed that the Munsell-numbered color will be known as ASA #70 - *Skytone* at Ohio Brass. It is a light gray glaze with a slight blue-green cast, and blends well with the sky in sunlight and with clouds behind it.

At this point, most people usually wonder, "Who the heck was Munsell?" We wondered, too, and in case you still are: Albert Henry Munsell was an American portrait painter who died in 1918, long before the industry began worrying about insulator colors.

Munsell established a system of color clarification and definition. He measured three dimensions of color -- hue, value, and chroma. He made it possible to express any particular color in precise terms and to differentiate it from other colors in the same general class. In Skytone, stated as Munsell No. 5 BG 7.0/0.4, the first number (5) represents the hue of blue-green (BG), with hue being the quality to distinguish one color from another -- green, blue, yellow. The second number (7.0) is the value, with value being the quality by which we distinguish a light color from a dark one; and (0.4) stands for chroma, or the strength of the proposed color.

We believe the color selection for Skytone was a good one. But the development and manufacture of glazes are difficult, at best.

A glaze is essentially a glass and is applied as a thin coating to adhere to the surface of a clay body. Glazes were developed centuries ago in the Eastern Mediterranean. During Antiquity, their function was purely ornamental. Today, ceramic ware is glazed to give it hardness and smoothness, which increases its durability and usefulness. Glaze is applied to electrical porcelain to improve electrical characteristics and increase strength.

In developing a new glaze such as Skytone (the proposed ASA #70), the base or colorless glaze must be compatible with the inorganic colors used to match the color standard. It melts and forms glass at normal kiln temperatures Yet too much fluidity causes it to run, leaving heavy and light areas in both the casting and the color. It should retain its smooth surface and impart strength to the porcelain body. Glaze color is affected by kiln temperatures and atmospheres, and therefore, some latitude must be given, with realistic limits of color definition. O-B has met all of these requirements in Skytone. We use neutral gray, pink, blue, and yellow color strains -- blended to produce a match to the Munsell gray standard. We find the allowable range of color variation is compatible with O-B's manufacturing processes.

Skytone was initiated by customer demand. It has progressed rapidly through development and standardization. Now, Skytone is an important glaze color for Ohio Brass porcelain production . . . available for your order.

New extension links give you further design flexibility

YOU can choose length and attachment style

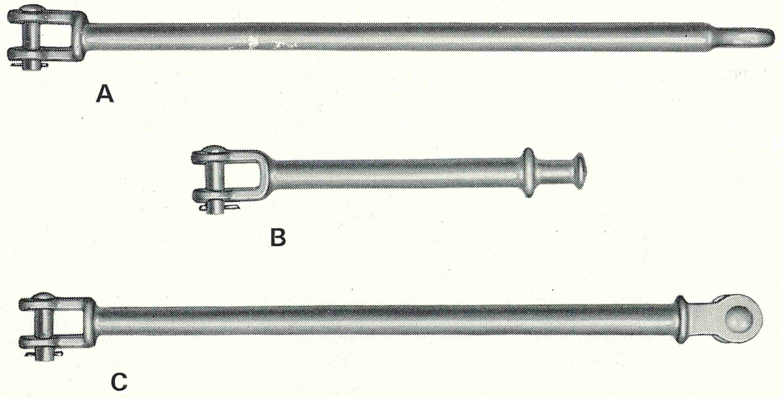
Now *you* can select the exact extension link required for your suspension system. You choose the correct length and attachment style to fit your specifications, then O-B manufactures and delivers your design. A total of six combinations of the standard clevis, eye, and ball connections are available. O-B can forge these ends in-line with each other, or rotate one end 90 degrees from the other to meet your design requirements.

At first glance, extension links appear unimportant in the over-all insulator-hardware assembly design. Their primary function is to link insulator string to tower, position the conductors for uniform striking distances, and provide adequate support. The flexibility offered by O-B links permits you to select the *exact* length and type of link required to achieve your specified string length and striking distance and include it in the insulator-hardware system design package. No special or complicated attachment design need be developed and you're assured proper spacing.

Depending upon the type of link you choose, O-B furnishes lengths from 7 inches to 120 inches. All connections are compatible with standard hardware components. For convenient "hot" line maintenance, O-B engineers include a hot-line collar on each link for attachment of "hot sticks." Hot-line tools may be attached securely to the "collar" and the load lifted from the insulator strings to permit maintenance of insulators. Inherent high strength assures adequate support, while hot dip galvanizing provides maximum corrosion resistance.

Check with your O-B district manager and see what he offers in extension links and other hardware fittings. New ideas in extension links give you further flexibility in EHV design, and just one more EHV "extra" from Ohio Brass.

Here's an example of the long and short story on O-B's extension links. Lengths from 7 inches to 120 inches give you a wide selection to meet your exact specifications.



O-B lets you select the type and length extension link you need for your suspension system. Choose any of six different combinations of clevis, ball, and eye connections. Shown here are a clevis eye (A), clevis ball (B), and clevis clevis with one end rotated 90 degrees from the other (C). Note the hot-line collar on each for attachment of lifting tools.

Holan introduces new aerial device control

A major breakthrough in aerial device controls has been made by Holan -- Division of The Ohio Brass Company. The new control system, called "HOLSTAT," will be incorporated in the design of Bronco Elbows and Charger Squirt Booms by Holan.

Safer and more dependable than conventional controls, the new system features separate and remote controls and high-pressure operating circuits. Controls at the bucket actuate corresponding hydraulic directional control valves at the pedestal by a "static" fluid method. All hydraulic pressure and flow is confined to the operating circuit, located well below the hinge of the lower arm. No fluid flows through the upper arms, thus a ¾-inch multiple-signal control line effectively eliminates the conventional 3-inch - 4-inch high-pressure control-line bundle.

The new aerial-device control system provides movements as accurate and as repeatable as movements of the operator's hand. A built-in feature of the lower control valve permits individual adjustment for speed on any function.

All control commands applied at the bucket produce proportional control movement at the pedestal -- and provide proportional movement of the aerial-device arms. Boom or elbow movements are the same whether controls are actuated at the bucket or at the pedestal. For added safety, pedestal controls override controls at the bucket.

There is no waiting for the engine of the aerial device to "run up" to operating RPM after controls are actuated. The operator has full control and full power at his disposal as soon as he actuates a "safety" control (energizes unloader valve to closed position).

There is no real flow of hydraulic fluid in the new Holan control system -- and no control linkage, in the strictest sense. Fluid in the control system is kept completely separate from the moving fluid in the main hydraulic system.

Control-system fluid, sealed in control lines, is virtually motionless, even during control actuation. But pressure, applied when the operator moves a control at the bucket, is transmitted as a low power-level signal to a hydraulic amplifier at the pedestal. The individual control lines have been compared with flexible cable controls, in which a liquid column is substituted for the metal cable.

Use of the low-pressure control lines to actuate valves in the main hydraulic system offers a number of advantages over conventional aerial-device control systems. For example, the ability to operate pedestal-mounted valves from the bucket without running high-pressure lines between pedestal and bucket reduces the chance of fluid leakage on the upper arm and the resulting loss in dielectric strength or fire hazard.

Additional accessory items, such as control of the engine and signal systems, employ the same principle as the basic control package.

Since the control system and the main hydraulic system are separate, THE CONTROL SYSTEM CAN BE FILLED WITH ANY TYPE LIQUID. Operation is not affected by low temperatures even when conventional hydraulic fluid is used.

The new control system was developed as a result of four years of engineering and prototype work. The final design has been subjected to rigorous operational tests for more than nine months. It has given first-class performance at temperatures as low as −40-degrees Fahrenheit.

Modular design is utilized wherever possible in the new Holan control system. Plug-in units contain valves and other circuit components. The system can be obtained with conventional toggle levers, with a combination hand rest and safety device, or with a new one-hand control which features an integral on-off lever. For additional operational safety, a dual safety system is available which requires linemen in each bucket to depress bucket-mounted buttons for system actuation. The control units, are attractively finished in copper anodized aluminum.

Names of control functions are molded in the ends of the levers, which helps prevent lever labels from being accidentally interchanged or discarded.

For more information, write Holan -- Division of The Ohio Brass Company, 4100 West 150th Street, Cleveland, Ohio 44135.

Carrying bundle conductors through running corners demands special yoke plates

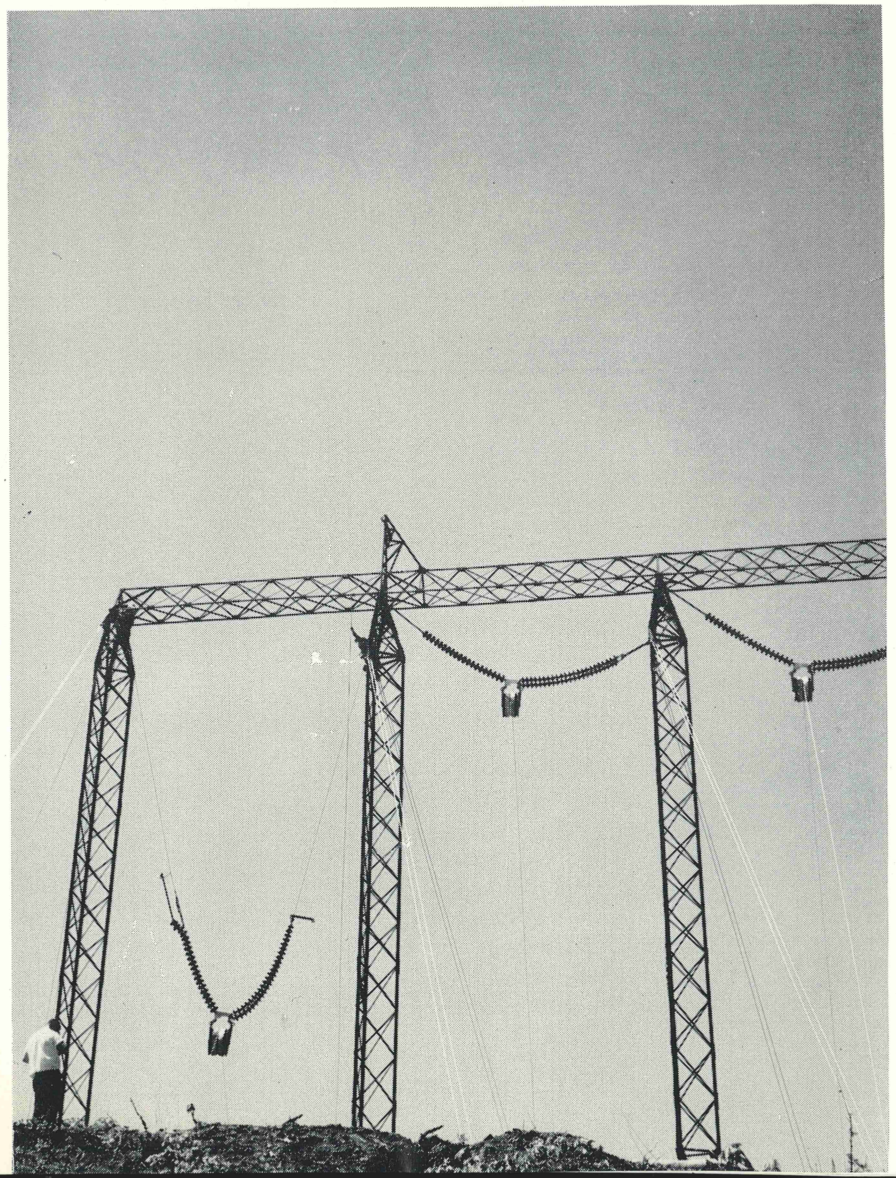
O-B's experience on present EHV construction covers broad range of applications

Engineers contemplating the construction of an EHV line with bundle conductors have often been puzzled about establishing the desired plane of the bundle through running corners that may reach 15 degrees or more. This, of course, is a matter of geometry in the supporting yoke plate coordinated with other structural elements.

It is intended that the conductor bundle shall not tilt. Different load conditions, however, cannot always be perfectly compensated. Thus, tilt may occur, either toward or away from the angle, at various loadings. This is not left to chance. The degree of tilt must be predetermined. Calculations for this are made by the line designers, dealing with such factors as conductor tension, corner angle, terrain, and position of insulator strings.

When a running corner has been computed, O-B will design and supply the proper yoke plates and supporting insulation. During preliminary layout of the line, however, it is desirable to consult with us on this detail. Previous experience has considerable value in the technique of bringing a bundle of conductors through a corner. Stresses developed by the independent subconductors and anchorage provided by insulators all meet at the yoke plate which must assume a specified position under tension. Design of the plate may involve somewhat complex factors. A conference between the men involved may develop a few compromises that will simplify the entire job.

Because O-B hardware designs are being used so extensively on new EHV construction today . . . now going up on lines with two, three, and four conductors . . . a wealth of experience is being accumulated on practical details of running corners involving these bundle configurations. This experience is at your disposal, and a preliminary discussion early in your design of the line may be quite advantageous.



Typical EHV running corner involving two conductors in hilly terrain. Designs have been developed for similar applications with other bundle conformations. Insulating supports in the case illustrated call for double strings of 36,000-pound units on the outside, and single strings of 50,000-pound units on the inside of each phase.

From soft clay to shipping carton . . .

O-B handles low-voltage pintypes with care

It's easy to take distribution pintype insulators for granted. Put 'em up and forget 'em! That's the story O-B pintype customers tell; because, after the design is carefully evolved by the Engineering Department, Ohio Brass gives pintypes plenty of thought and tender loving care during manufacture— before they go to work. That's why O-B pintypes provide long-term continuity of service with little or no maintenance. They're made to withstand the test of the severest distribution duty, i. e., lightning stroke. This takes men with knowledge, experience, and patience -- sound ingredients of a good product well produced by experts. You can see it in the way O-B pintype insulators are manufactured.

In bringing insulator clay to its workable state, no shapes or sizes are yet distinguishable. The clay remains a faceless mass. Only after extruding the clay from a pug mill does it begin to take the shape of the intended product.

Large round cakes of soft clay are placed in the pug-mill hopper. Powerful blades break up the clay cakes and feed the chunks into the mill. The pug mill operates under a vacuum—redistributing the moisture and de-airing the clay mixture. The repacked clay is extruded and cut into pieces called pugs or blanks. Each soft, densely solid blank contains enough clay for one pintype insulator.

An important hand-forming operation takes place next. It's called "balling the clay." Each pintype blank is tossed and slapped five or six times with strong hands. This "sets up" the clay for forming. The "balled" blank is dropped into a mold which carries the clay blank in a hot-pressing cycle. The insulator's petticoats on the underside are formed and the pintype threads are formed with precision. For the first time, the heretofore lump of clay becomes a pintype, with a definitive "porcelain personality."

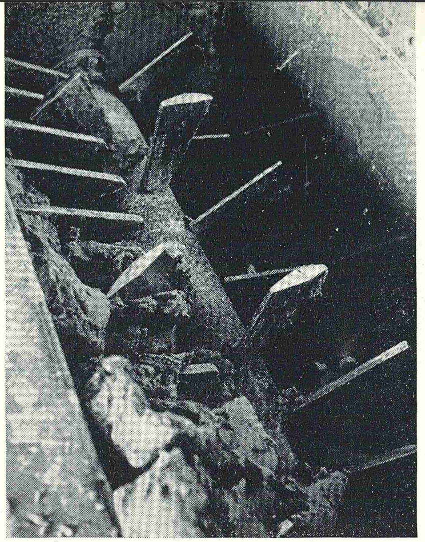
After it has dried sufficiently, the mold is dumped and the head section is trimmed to form the conductor and tie wire grooves. The glazing machine then applies O-B's conduction glaze and the glaze finish. Personal handling during this operation allows close inspection and extra checks against superficial defects.

One of the final operations is firing in the continuous kiln. Pintypes "ride along" with larger ware, often filling out vacant spots on the kiln car for optimum production efficiency. Standby storage of a variety of insulator bodies, pintypes and others ready for kiln firing, is a customary sight in the vicinity of the kilns at O-B's porcelain manufacturing plant in Barberton, Ohio.

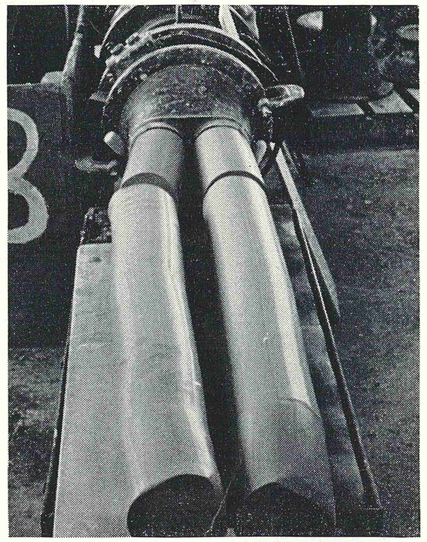
The "long" ride through the kiln under closely controlled conditions produces two to three days of vitrification. This is the process which transforms the pintype-shaped mass of clay into a hard-glazed porcelain insulator for distribution service.

According to standards, all O-B pintypes are subjected to an electrical test prior to shipment. After testing and inspection, they are packaged in strong, sectionalized cartons and shipped to electric utilities for installation or to Graybar warehouses for future delivery to nearby Graybar utility customers.

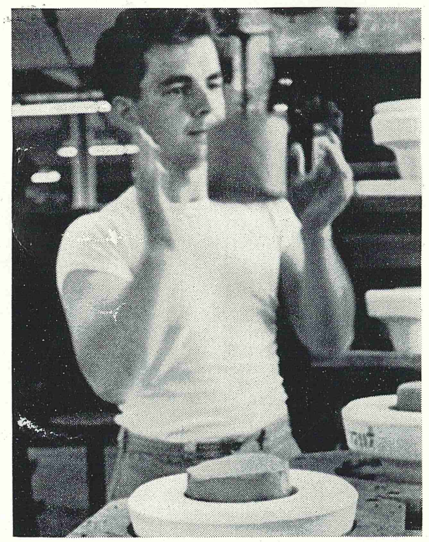
If you would like to know more about O-B porcelain manufacturing, simply drop a card or letter to Dept. 1620-H, *Hi-Tension News*, Ohio Brass Company, Mansfield, Ohio. Or, ask your O-B district manager for information.



Powerful blades in the pug-mill hopper break up clay cakes for processing.

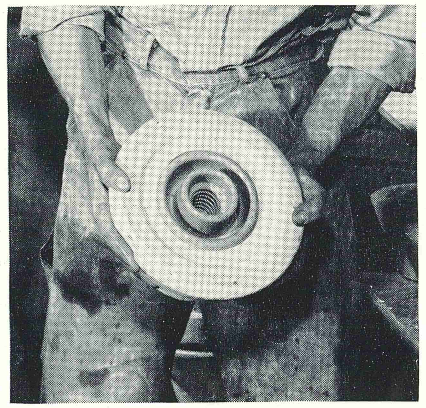


Clay extruded from the pug mill is cut into pugs or blanks for forming.

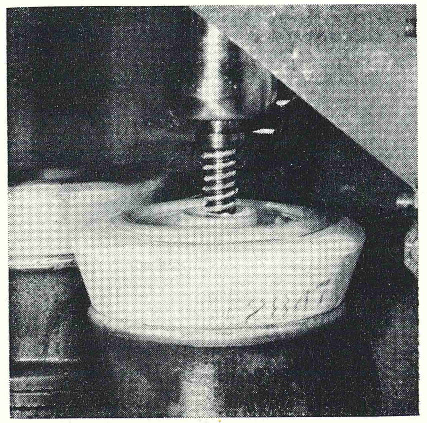


"Balling the clay" prior to depositing it into a mold as seen in foreground.

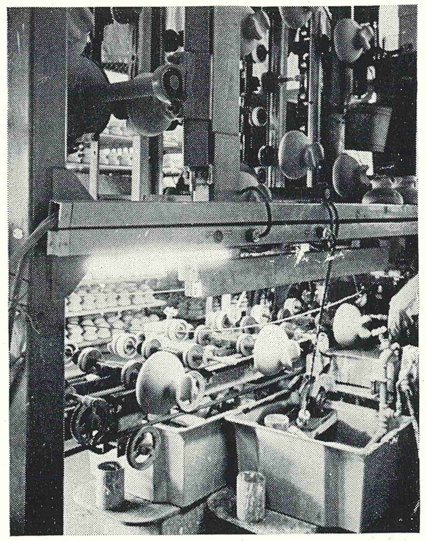
Graybar QUALITY SINCE 1869 Distributed by Graybar ELECTRIC COMPANY



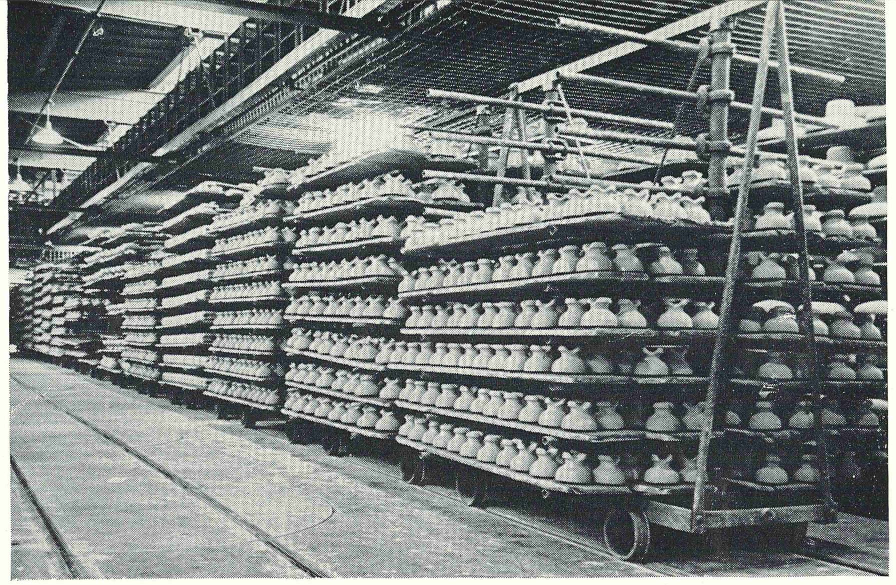
Petticoats of the pintype insulator are formed during the hot-press cycle.



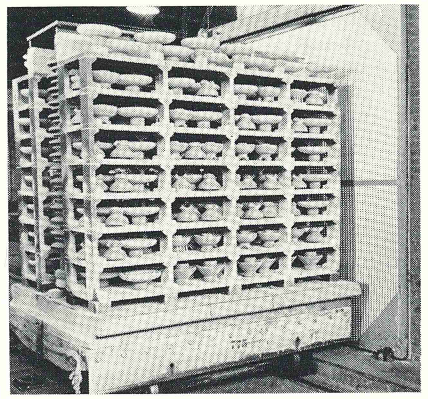
Insulator pinhole threads are formed in the soft clay on the hot-press machine.



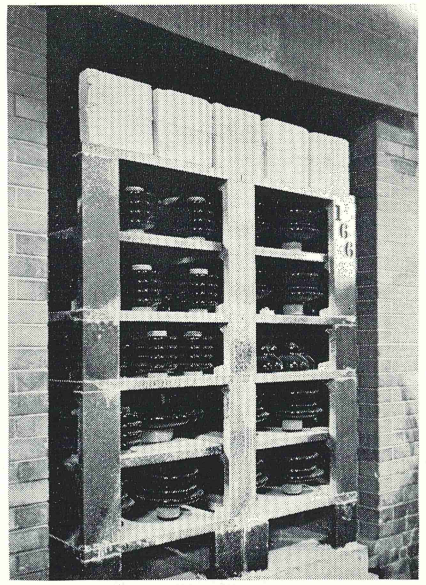
Large glazing machine automatically adds conduction glaze and glaze finish to the pintypes.



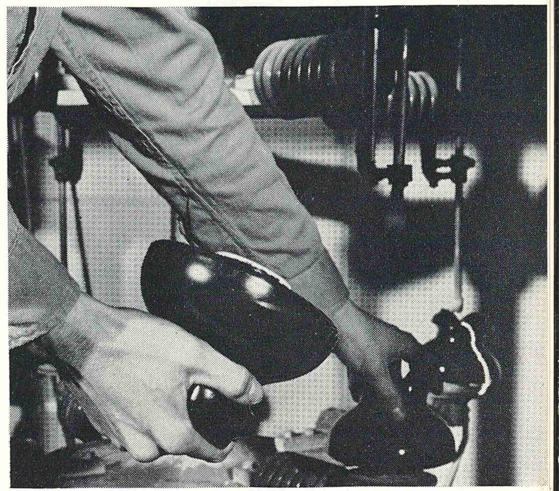
Standby storage for pintype clay bodies and other clay bodies before loading on the kiln car.



Pintype clay bodies are mixed with other shapes on kiln car ready for entrance into firing cycle.



Pintype and other porcelain insulators emerge after undergoing two to three days of the vitrification process in the kiln.



O-B pintypes are subjected to a standard electrical test before shipment.

BRASS
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OHIO BRASS
OHIO BRASS

Strong, sectionalized corrugated cartons are used to ship O-B pintype insulators to their destination.

Tower improvements with V-strings include a broad range of economies

How do V-strings affect tower design . . . and cost?

The question of towers is sometimes secondary in V-string considerations. Reduced EHV right-of-way acreage can produce spectacular savings that may overshadow the economies inherent in the structure. We would like, therefore, to give the subject of towers a little well-deserved attention.

Accompanying illustrations present the same general criteria in three modes of construction. While Figure 1 roughly coincides with a new 500-kv line now being built, the assumptions made are not related to a specific project.

A few constants rule these figures. In all cases a minimum 15-foot clearance to the structure is maintained. A wind blow-out angle of 40 degrees is assumed. It will be seen that this angle is taken on free-swinging insulator strings, whereas the V-strings are built at 45 degrees. This is customary. The "V" is approximately five degrees wider than the computed maximum blowout angle to avoid mechanical unloading of the string on the lee side in wind conditions.

Comparing Figure 2 (partial V-string construction) with Figure 1, no significant difference in crossarm length is indicated. But a gross difference exists in the distance between phase conductors. Center of suspended weight for the outer phase in Figure 1 is 15 feet from the vertical tower support. In Figure 2 this weight is suspended 29 feet outboard. This difference can involve a variety of cost factors in tower design.

Since the vertical members in Figure 3 are almost 30 feet farther apart, this will result in a major increase in tower size and material. The whole tower must be larger and stronger to support the longer crossarm.

Towers in position on the right-of-way for an EHV line have three primary elements of cost: (A) Material and shop fabrication. (B) Transportation to the construction site. (C) Erection.

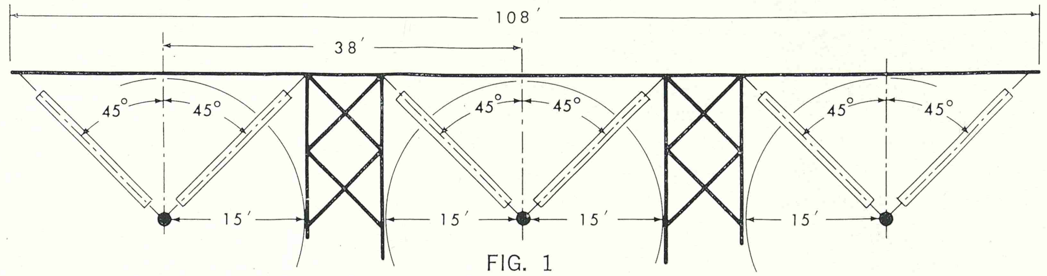

FIG. 1

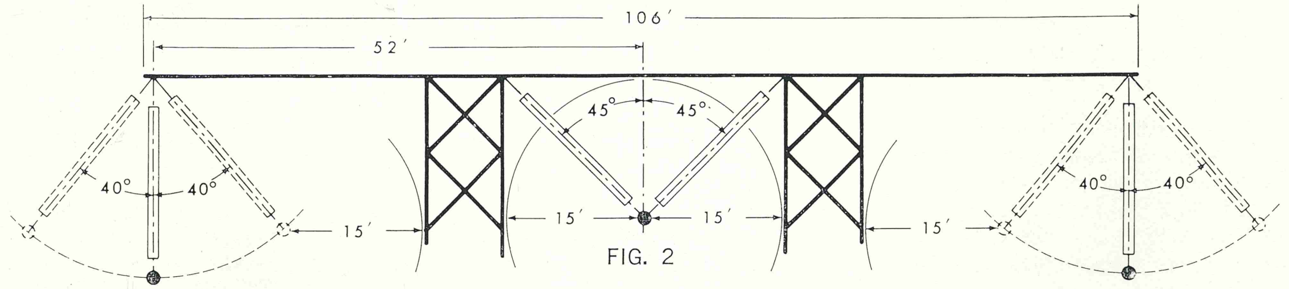

FIG. 2

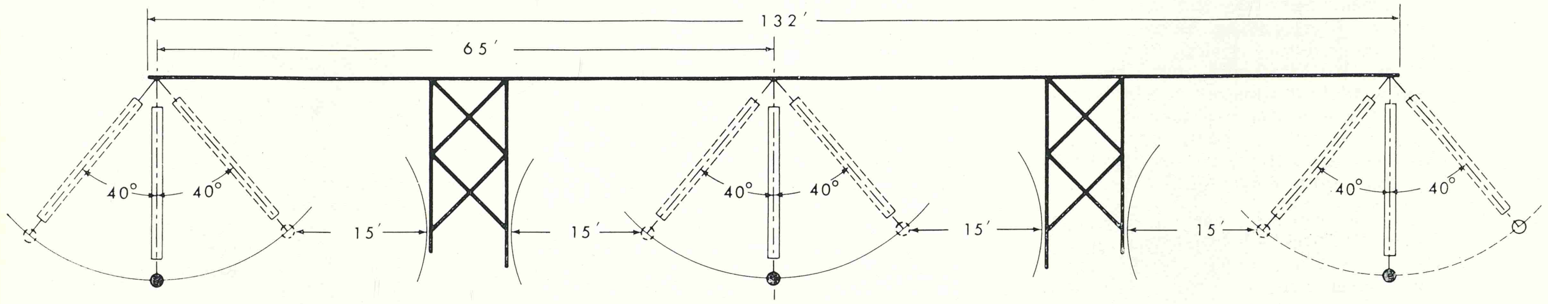

FIG. 3

"A" above is a relatively stable cost and is a direct function of overall size and dimensions of members. "B" is a variable, and sometimes a very substantial one. EHV lines often penetrate remote or rough territory. In cases of bad access, tower material may be delivered by helicopter, or laboriously brought in by slow, heavy land vehicles. In spotting four or five towers per mile, a ton per tower more or less becomes a very tangible item of cost. "C" relates directly to labor time. Fewer, lighter members handle more quickly. On a line where an average of two towers a day were being built, the superintendent commented, "Because the structures are easier to frame, I think my crew gains a tower or two a week."

Cost of a tower cannot be computed until it is ready to accept conductors. Smaller, lighter, simpler structures offer a host of savings. These will naturally vary between lines, but from general experience one can anticipate recovering at least 10 per cent in tower cost through the use of V-strings. In some cases, this figure has gone considerably higher.

While the dimension is not shown on the sketches, length of free-swinging insulator strings in Figures 2 and 3 is scaled at 21 feet, conductor to tower. V-strings have the interesting (and sometimes unrecognized) property of applying overturn force at the level of the conductors. Free-swinging insulator strings apply this force at the crossarm. This transfer of overturn force 21 feet on the tower is sometimes taken into consideration by designers. More generally, it is accepted as an added safety factor.

Note on Figure 1 that conductor spacing is 38 feet and increases respectively to 52 feet and 65 feet in the following figures. Inductive reactance between conductors increases with distance. This electrical property limits the amount of power a line will accept. It is a greater factor than resistance in the

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line's ability to deliver maximum megawatts. Closely spaced conductors reduce the inductive reactance effect and materially increase the power-handling capacity of the line, with all other factors equal. Electrical designers can well afford to take a hard look at this question. The compact conductor configuration with V-strings will increase the transmission efficiency of a line.

Most conventional tower designs suspend the overhead ground wires from some extension of an existing vertical member. As outside phases get farther away from the central supporting elements, the lightning shield angle increases. This adversely affects the protective action of the ground wires. Closer phase spacing as a result of V-strings may provide a material improvement in lightning protection.

Even without consideration of land savings that involve such matters as original acreage, clearance, brush control, maintenance, and taxes, it will be seen that V-strings have quite a story to tell purely from a standpoint of the improved tower design they make possible. To complete the picture of economy, however, the matter of land utilization is briefly presented in Figures 4, 5, and 6.

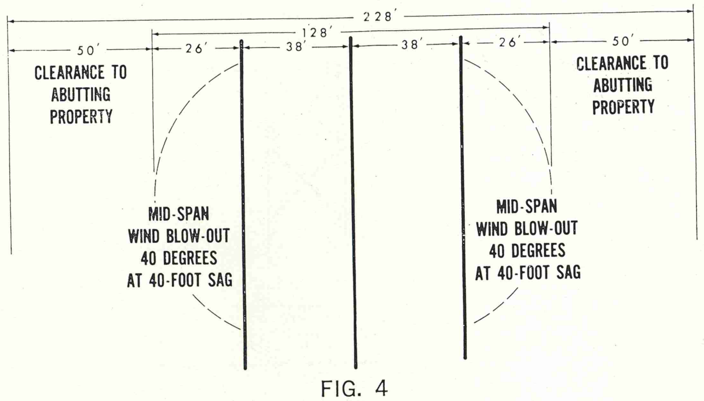
No one but the individual power company involved can place a specific value on structure savings through the use of V-strings; and this only after various trial designs are made with all local factors taken into account. While the saving will probably be considerable, the actual dollars must come from an engineering estimate.

This is not the case in the matter of land for right-of-way. Here we deal with absolute quantities. Eight feet of right-of-way equals one acre per mile.

Data used in compiling Figures 1, 2, and 3 has been transferred to a simple plat of three lines, (Figures 4, 5, and 6) all based on the same criteria except for method of insulation. Conductor sag at mid-span is assumed to be 40 feet. Wind blow-out at mid-span is assumed to be 40 degrees. Clearance to abutting property is assumed to be 50 feet. Tower spacing in the drawings is greatly foreshortened for convenience.

In Figure 4, corresponding to Figure 1, right-of-way requirements total 28½ acres per mile, including clearance to abutting property. In Figure 5, corresponding to Figure 2, right-of-way requirements are 35½ acres per mile, including side clearance. In Figure 6, corresponding to Figure 3, the requirement increases to 38¾ acres per mile.

Full V-string construction as in Figure 1, compared to free-swinging insulators in Figure 3, saves 10¼ acres per mile in these examples. Valuing the land as low as $350 per acre will produce a saving of $3,675 per mile. We suggest applying your own experience with land values to the 10¼ acres-per-mile saved, and you will begin to appreciate the magnitude of land economy with V-strings.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26′
38′
38′
26′
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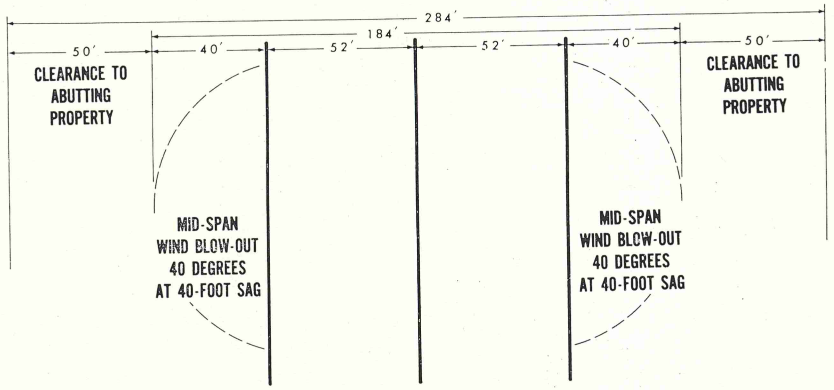
CLEARANCE TO ABUTTING PROPERTY
CLEARANCE TO ABUTTING PROPERTY
MID-SPAN WIND BLOW-OUT 40 DEGREES AT 40-FOOT SAG
MID-SPAN WIND BLOW-OUT 40 DEGREES AT 40-FOOT SAG

FIG. 4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MID-SPAN WIND BLOW-OUT 40 DEGREES AT 40-FOOT SAG
MID-SPAN WIND BLOW-OUT 40 DEGREES AT 40-FOOT SAG

FIG. 5

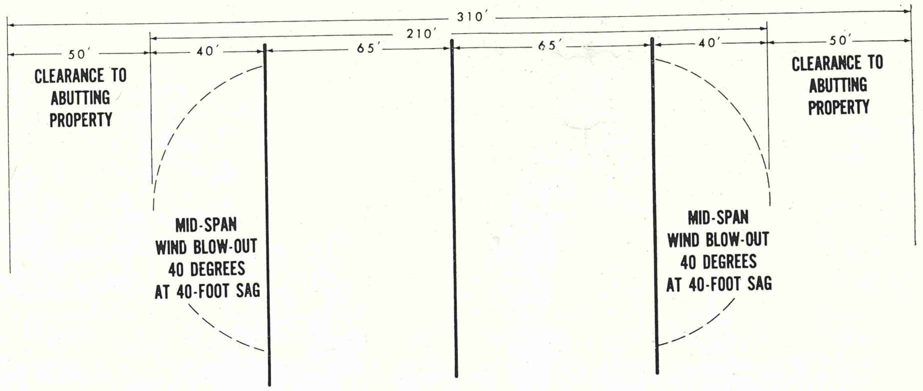

310′
210′
50′
40′
65′
65′
40′
50′
CLEARANCE TO ABUTTING PROPERTY
CLEARANCE TO ABUTTING PROPERTY
MID-SPAN WIND BLOW-OUT 40 DEGREES AT 40-FOOT SAG
MID-SPAN WIND BLOW-OUT 40 DEGREES AT 40-FOOT SAG

FIG. 6

Match Multirester's line terminal to your requirements . . .

O-B assembles parts and ships arresters to your order

THOREX® MULTIRESTER

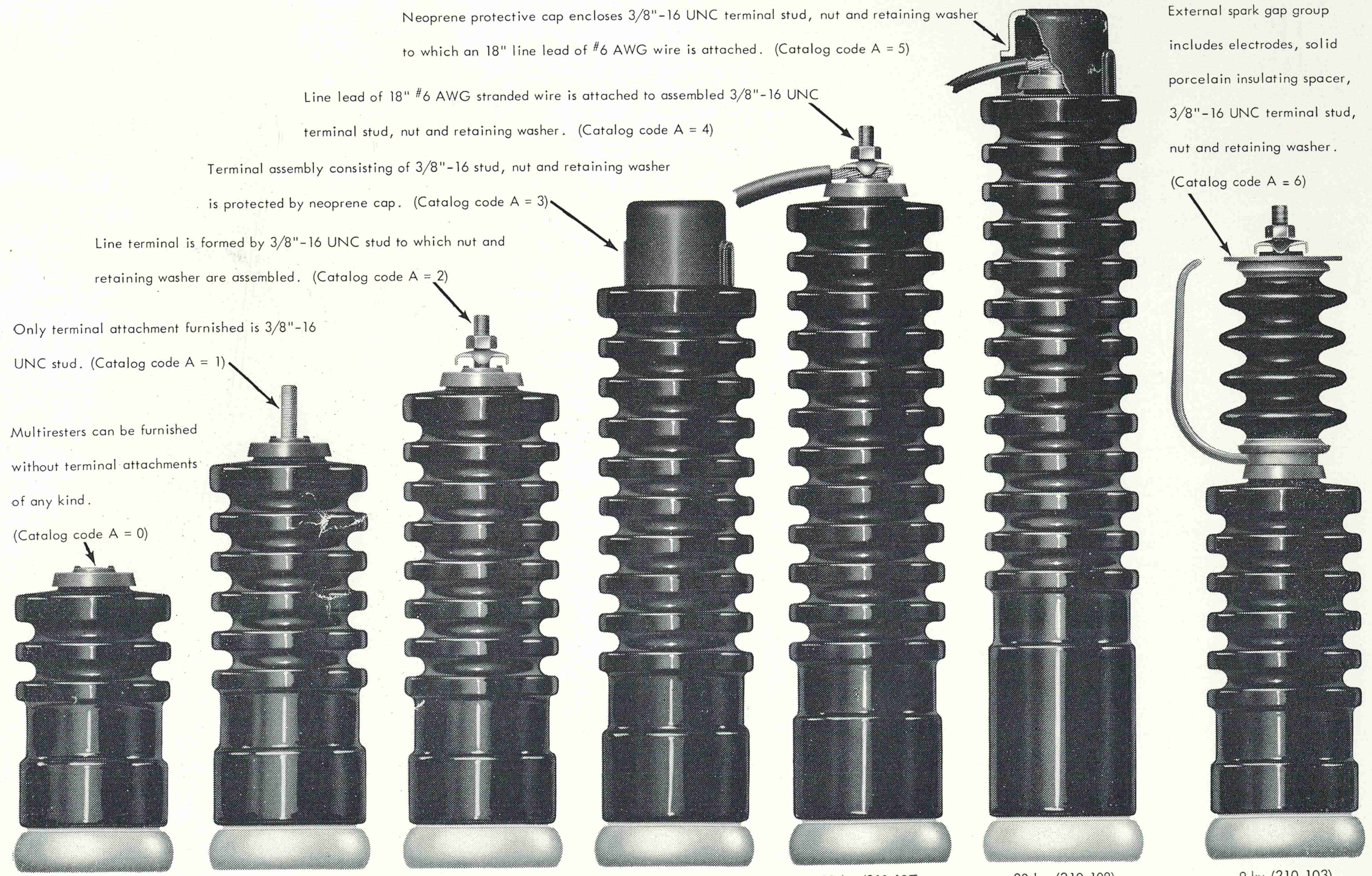
Prudent selection of optional accessories for distribution class arresters often means that high performance Multiresters with exactly the right fittings for your application can be specified at less than the total cost for conventional arresters with parts superfluous to your needs.

Advantages of optional arrester accessories are shown in the assemblies below, which illustrate available Multirester line terminal attachments. Similar flexibility applies to Multirester ground terminal parts and mounting devices. Furthermore, many of the parts are standard hardware items and additional savings may be realized by local purchase or availability from warehouse stock.

Top terminal construction for all Multirester ratings from 3 through 20 kv provides a ¾-inch deep ⅜-inch 16 UNC tapped hole for basic interchangeability of all line terminal accessories. Above 20 kv, a reducing bushing in the ⅝-inch tapped terminal hole permits use of standard accessories shown.

The external spark gap assembly is furnished as an optional line terminal accessory on Multiresters from 3 through 20 kv. Although the air gap assembly is detachable from the arrester unit, its interchangeability is limited since over-all height and gap spacing must be coordinated with the arrester rating on which the assembly is installed.

Catalog 43 explains the simple code system used to order Multiresters with selected accessories. Line terminal parts are the "A" portion of the 7 A B C suffix identification and correct catalog numbers are quickly ascertained by substituting the corresponding number designation of the group selected.


Neoprene protective cap encloses 3/8"-16 UNC terminal stud, nut and retaining washer to which an 18" line lead of #6 AWG wire is attached. (Catalog code A = 5)

Line lead of 18" #6 AWG stranded wire is attached to assembled 3/8"-16 UNC terminal stud, nut and retaining washer. (Catalog code A = 4)

Terminal assembly consisting of 3/8"-16 stud, nut and retaining washer is protected by neoprene cap. (Catalog code A = 3)

Line terminal is formed by 3/8"-16 UNC stud to which nut and retaining washer are assembled. (Catalog code A = 2)

Only terminal attachment furnished is 3/8"-16 UNC stud. (Catalog code A = 1)

Multiresters can be furnished without terminal attachments of any kind. (Catalog code A = 0)

External spark gap group includes electrodes, solid porcelain insulating spacer, 3/8"-16 UNC terminal stud, nut and retaining washer. (Catalog code A = 6)

6 kv (210 102)
Not shown: 3 kv (210 101)

10 kv (210 104)

12 kv (210 105)

15 kv (210 106)

18 kv (210 107)

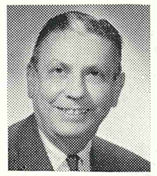
20 kv (210 108)

9 kv (210 103)

OHIO BRASS MANAGEMENT REPORT

Will diplomas on the wall outrank carpet on the floor?

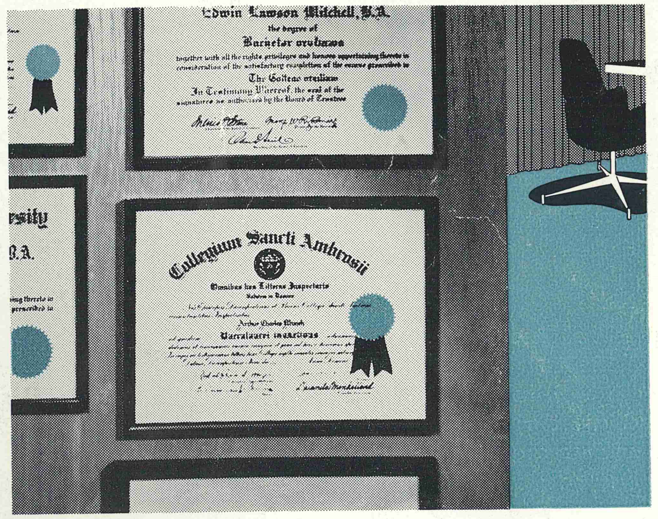
BY ROGER A. BLACK
PRESIDENT, OHIO BRASS COMPANY



An executive's status may soon be measured by the number of diplomas on the wall rather than the thickness of the carpet on the office floor. Today many top college graduates shun industry's job offers and turn to graduate school. Engineering college deans say that four years of college are not enough. Moreover, they add that engineers who graduated before 1955 lack sufficient background in mathematics and science.

WE WOULDN'T DOWNGRADE the value of formal education, and plenty of it, even if we had that much courage. Our Company competes hard for the top engineers, and we get our share. But we don't consider our engineers who graduated before 1955 obsolete. Look at the people responsible for O-B lightning arrester development, for example. At least two of the top engineers haven't seen the inside of a college classroom for over 10 years. And if they did, there is really little they could learn that would help them improve lightning arresters. They would have to write the text books before they could study them.

WE TRY TO DEVELOP engineers with ideas. The quality of their ideas depends on their ability to educate themselves. We ask an engineer to keep up to date on outside developments while he grows in his capacity to handle his job. We can't afford to shuttle him between job and campus. Simple economics dictate that he, like most of us, must spend more time working than studying. And often, work proves to be the best teacher of all.



WE ALSO AVOID CATEGORIZING a man's talent according to his education. Although the electrical engineers on our staff far outnumber other types, we have seen mechanical engineers solve electrical problems that baffled electrical men. We need the new emphasis on quality and quantity of education. But degrees don't always measure capability, or even true education. Experience teaches also, and the man who learns from his experience will be a highly productive employee long after his degree is theoretically obsolete.

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OHIO BRASS

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HI-TENSION NEWS

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Thorex Type MPR lightning arresters in surge-protective position on 345-kv outgoing lines at the Niagara Falls plant of Power Authority of State of New York